UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,700	01/10/2004	Christine M. Greiser	A3182Q-US-NP	3437

7590 05/24/2007

Patent Documentation Center
Xerox Corporation
Xerox Square 20th Floor
100 Clinton Ave. S.
Rochester, NY 14644

EXAMINER	
FIDLER, SHELBY LEE	
ART UNIT	**PAPER NUMBER**
2861	

MAIL DATE	DELIVERY MODE
05/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/755,700	GREISER ET AL.	
	Examiner	Art Unit	
	Shelby Fidler	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/16/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,13-17,19-27 and 29-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,13-17,19-27 and 29-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Responsive Office Action

This Office Action is responsive to amendments/remarks filed 1/16/2007.

Claim Objections

Claim 17 is objected to because of the following informalities: please change all recitations of "the first sub-column" to "the first linear sub-column" to correct a minor problem of antecedent basis. A similar objection applies to recitations of "the second sub-column."

Also, please change the recitation of "each columnar array" found on lines 13, 14, 17, and 18 of the claim to "each first columnar array" to correct a minor problem of antecedent basis.

Also, please change the period found on line 19 of the claim to a semicolon. Appropriate correction is required.

Claim 23 is objected to because of the following informalities: please change all recitations of "first sub-column" to "first linear sub-column" to correct a minor problem of antecedent basis. A similar objection applies to recitations of "second sub-column." Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 11, 13, 14, 17, 19, 20-24, 27, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. (US 7052117 B2) in view of Eck et al. (US 6742867 B2).

Regarding claim 1:

Bibl et al. disclose a drop emitting device (ink jet printhead 10) comprising:

a linear array of side by side substantially mutually parallel columnar arrays of ink drop generators (set of nozzle rows defined by printhead units 80 shown in Fig. 1; col. 6, lines 9-13), the linear array extending along an X-axis (axis defined by the arrow in Fig. 1);

each columnar array comprised of a first sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34) that is interleaved with a second sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34') such that each ink drop generator in the first sub-column is physically separated from every other ink drop generator in the first sub-column by at least a portion of one of the ink drop generators from the second sub-column (Fig. 5A);

a first ink manifold (manifold flow path 24);

a second ink manifold (manifold flow path 24');

wherein the first ink manifold is fluidically coupled to the first sub-column of ink drop generators of each columnar array and is not fluidically coupled to the second sub-column of each columnar array (Figs. 3 and 5A), and

wherein the second ink manifold is fluidically coupled to the second sub-column of ink drop generators of each columnar array and is not fluidically coupled to the first sub-column of each columnar array (Figs. 3 and 5A).

Bibl et al. do not expressly disclose that the columnar arrays are oblique to the X-axis.

However, Eck et al. disclose a drop emitting device (printing device) comprising a linear array of parallel columnar arrays of ink drop generators (row of printheads), the linear array extending along an X-axis (horizontal axis of Fig. 1), and the columnar arrays being oblique to the X-axis (col. 2, line 66 - col. 3, line 1 and Fig. 1).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to use columnar arrays that are oblique to the X-axis into the invention of Bibl et al. The motivation for doing so, as taught by Eck et al., is to achieve greater resolution (col. 2, line 66 - col. 3, line 1).

Regarding claim 2:

Bibl et al. also disclose that the columnar arrays of drop generators comprise linear arrays of drop generators (Fig. 5A).

Regarding claims 3, 13, 19, and 29:

Bibl et al. also disclose that the drop generators comprise piezoelectric drop generators (col. 6, lines 47-48 and Fig. 3).

Regarding claims 4, 14, 20, and 30:

Bibl et al. also disclose that the drop generators respectively include an ink pressure chamber (e.g. pumping chambers 33), an outlet channel (e.g. nozzle flow paths 34), and a nozzle (nozzle openings 22).

Regarding claims 5 and 21:

Bibl et al. also disclose that the first ink manifold (24) receives ink of a first color (col. 6, lines 14-16), and the second ink manifold (24') receives ink of a second color (col. 6, lines 14-16).

Regarding claims 6 and 22:

Bibl et al. also disclose that the first ink manifold (24) and the second ink manifold (24') receive ink of a same color (col. 6, lines 14-16 shows that each printhead unit 80 is supplied one color).

Regarding claims 7 and 23:

Bibl et al. also disclose that the drop emitting device further includes a plurality of finger manifolds (ink supply paths 30 and 30') wherein each first sub-column of drop generators is fluidically connected to a first finger manifold (nozzle flow paths 34 connect to ink supply path 30; Figs. 3 and 5A) and each second sub-column of drop generators is fluidically connected to a second finger manifold (nozzle flow paths 34' connect to ink supply path 30'; Figs. 3 and 5A).

Regarding claims 8 and 24:

Bibl et al. also disclose that the drop emitting device further includes a plurality of side by side finger manifolds (ink supply paths 30 and 30'), wherein for each columnar array the first sub-column of drop generators is fluidically connected to a first finger manifold (nozzle flow paths 34 connect to ink supply path 30; Figs. 3 and 5A) and the second sub-column of drop generators is fluidically connected to a second finger manifold (nozzle flow paths 34' connect to ink supply path 30'; Figs. 3 and 5A) that is adjacent the first finger manifold (Figs. 3 and 5A).

Regarding claim 11:

Bibl et al. disclose a drop emitting device (ink jet printhead 10) comprising:

a linear array of side by side substantially mutually parallel columnar arrays of ink drop generators (set of nozzle rows defined by printhead units 80 shown in Fig. 1; col. 6, lines 9-13);

the linear array of columnar arrays of ink drop generators extending along an X-axis (axis defined by the arrow in Fig. 1);

wherein each columnar array is comprised of a first sub-column of ink drop generators (ink drop generators are defined by nozzle flow paths 34) that is interleaved with a second sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34') such that each ink drop generators in the first sub-column is physically separated from every other ink drop generator in the first sub-column by at least a portion of one of the ink drop generators from the second sub-column (Fig. 5A).

Bibl et al. do not expressly disclose that the columnar arrays of drop generators are oblique to the X-axis.

However, Eck et al. disclose a drop emitting device (printing device) comprising a linear array of parallel columnar arrays of ink drop generators (row of printheads), the linear array extending along an X-axis (horizontal axis of Fig. 1), and the columnar arrays being oblique to the X-axis (col. 2, line 66 - col. 3, line 1 and Fig. 1).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to use columnar arrays that are oblique to the X-axis into the invention of Bibl et al. The motivation for doing so, as taught by Eck et al., is to achieve greater resolution (col. 2, line 66 - col. 3, line 1).

Regarding claim 17:

Bibl et al. disclose a drop emitting device (ink jet printhead 10) comprising:

a first linear array of side by side substantially mutually parallel first columnar arrays of ink drop generators (set of nozzle rows defined by set of right-most printhead units 80 shown in Fig. 1; col. 6, lines 9-13), the first linear array of first columnar arrays of ink drop generators extending along an X-axis (axis defined by the arrow in Fig. 1); and

each first columnar array of ink drop generators comprised of a first linear sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34) that is interleaved with a second linear sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34') such that each ink drop generator in the first linear sub-column is physically separated from every other ink drop generator in the first linear sub-column by at least a portion of one of the ink drop generators from the second linear sub-column (Fig. 5A);

wherein a first ink manifold (manifold flow path 24) is fluidically coupled to the first linear sub-column of ink drop generators of each first columnar array and is not fluidically coupled to the second linear sub-column of each columnar array (Figs. 3 and 5A), and

wherein a second ink manifold (manifold flow path 24') is fluidically coupled to the second linear sub-column of ink drop generators of each first columnar array and is not fluidically coupled to the first linear sub-column of each first columnar array (Figs. 3 and 5A);

a second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators (set of nozzle rows defined by set of middle printhead units 80 shown in Fig. 1; col. 6, lines 9-13), the second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators extending along the X-axis (Fig. 1), and the second linear array of columnar arrays being adjacent the first linear array of first columnar arrays along a second axis orthogonal to the X-axis (Fig. 1);

each second columnar array comprised of a third linear sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34, and corresponding to the middle set of printhead units 80 shown in Fig. 1) that is interleaved with a fourth linear sub-column of ink drop generators (ink drop generators defined by nozzle flow paths 34', and corresponding to the middle set of printhead units 80 shown in Fig. 1);

wherein the third linear sub-column of ink drop generators is fluidically coupled to a third ink manifold (nozzle flow paths 34 are coupled to manifold flow path 24; Figs. 3 and 5A); and

wherein the fourth linear sub-column of ink drop generators is fluidically coupled to a fourth ink manifold (nozzle flow paths 34 are coupled to manifold flow path 24'; Figs. 3 and 5A).

Bibl et al. do not expressly disclose that the first and second columnar arrays are oblique to the X-axis.

However, Eck et al. disclose a drop emitting device (printing device) comprising linear arrays of parallel columnar arrays of ink drop generators (rows of printheads), the linear array extending along an X-axis (horizontal axis of Fig. 1), and the columnar arrays being oblique to the X-axis (col. 2, line 66 - col. 3, line 1 and Fig. 1).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to use columnar arrays that are oblique to the X-axis into the invention of Bibl et al. The motivation for doing so, as taught by Eck et al., is to achieve greater resolution (col. 2, line 66 - col. 3, line 1).

Regarding claim 27:

Bibl et al. disclose a drop emitting device (ink jet printhead 10) comprising:

a linear array of side by side substantially mutually parallel first columnar arrays of ink drop generators (set of nozzle rows defined by set of right-most printhead units 80 shown in Fig. 1; col. 6, lines 9-13), the linear array of first columnar arrays of ink drop generators extending along an X-axis (axis defined by the arrow in Fig. 1);

a second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators (set of nozzle rows defined by set of middle printhead units 80 shown in Fig. 1; col. 6, lines 9-13), the second linear array of side by side substantially mutually parallel second columnar arrays of ink drop generators extending along the X-axis (Fig. 1); and

the second linear array of columnar arrays being adjacent the first linear array of first columnar arrays along a second axis orthogonal to the X-axis (Fig. 1),

wherein each first columnar array is comprised of first and second linear sub-columns of ink drop generators (ink drop generators defined by nozzle flow paths 34 and 34', and corresponding to the right-most set of printhead units 80 shown in Fig. 1) that are interleaved with each other such that each ink drop generator in the first sub-column is physically separated from every other ink drop generator in the first sub-column by at least a portion of one of the ink drop generators from the second sub-column (Fig. 5A), and each second columnar array is comprised of third and fourth linear sub-columns of ink drop generators (ink drop generators defined by nozzle flow paths 34 and 34', and corresponding to the middle set of printhead units 80 shown in Fig. 1) that are interleaved with each other such that each ink drop generator in the third sub-column is physically separated from every other ink drop generator in the third sub-column by at least a portion of one of the ink drop generators from the first sub-column (Fig. 5A).

Bibl et al. do not expressly disclose that the first and second columnar arrays are oblique to the X-axis.

However, Eck et al. disclose a drop emitting device (printing device) comprising linear arrays of parallel columnar arrays of ink drop generators (rows of printheads), the linear array extending along an X-axis (horizontal axis of Fig. 1), and the columnar arrays being oblique to the X-axis (col. 2, line 66 - col. 3, line 1 and Fig. 1).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to use columnar arrays that are oblique to the X-axis into the invention of Bibl et al. The motivation for doing so, as taught by Eck et al., is to achieve greater resolution (col. 2, line 66 - col. 3, line 1).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 1 above, and further in view of Silverbrook (US 6270182 B1).

Regarding claim 9:

Bibl et al. as modified by Eck et al. disclose all claimed limitations except that the drop generators receive melted solid ink.

However, Silverbrook discloses that it is known to provide melted solid ink to the drop generators (col. 21, line 10 - col. 22, line 12 and the table of col. 51).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to provide melted solid ink, such as that taught by Silverbrook, into the drop generators of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by

Silverbrook, is that hot melt ink can be used on almost any medium and dries instantly without cocking the medium (table of col. 51).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 1 above, and further in view of Burr et al. (US 5907338).

Regarding claim 10:

Bibl et al. as modified by Eck et al. do not expressly disclose that the drop generators are implemented in a laminar stack of metal plates.

However, Burr et al. disclose forming drop generators by implementing a laminar stack of stainless steel plates (col. 7, lines 15-18).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize a laminar stack of metal plates to form the drop generators in the invention of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Burr et al., is to facilitate manufacture of the ink jet print head since layer-to-layer alignment is not critical (col. 7, lines 21-24).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 11 above, and further in view of Silverbrook (US 6270182 B1).

Regarding claim 15:

Bibl et al. as modified by Eck et al. disclose all claimed limitations except that the drop generators receive melted solid ink.

However, Silverbrook discloses that it is known to provide melted solid ink to the drop generators (col. 21, line 10 - col. 22, line 12 and the table of col. 51).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to provide melted solid ink, such as that taught by Silverbrook, into the drop generators of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Silverbrook, is that hot melt ink can be used on almost any medium and dries instantly without cocking the medium (table of col. 51).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 11 above, and further in view of Burr et al. (US 5907338).

Regarding claim 16:

Bibl et al. as modified by Eck et al. do not expressly disclose that the drop generators are implemented in a laminar stack of metal plates.

However, Burr et al. disclose forming drop generators by implementing a laminar stack of stainless steel plates (col. 7, lines 15-18).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize a laminar stack of metal plates to form the drop generators in the invention of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Burr et al., is to facilitate manufacture of the ink jet print head since layer-to-layer alignment is not critical (col. 7, lines 21-24).

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 17 above, and further in view of Silverbrook (US 6270182 B1).

Regarding claim 25:

Bibl et al. as modified by Eck et al. disclose all claimed limitations except that the drop generators receive melted solid ink.

However, Silverbrook discloses that it is known to provide melted solid ink to the drop generators (col. 21, line 10 - col. 22, line 12 and the table of col. 51).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to provide melted solid ink, such as that taught by Silverbrook, into the drop generators of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Silverbrook, is that hot melt ink can be used on almost any medium and dries instantly without cocking the medium (table of col. 51).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 17 above, and further in view of Burr et al. (US 5907338).

Regarding claim 26:

Bibl et al. as modified by Eck et al. do not expressly disclose that the drop generators are implemented in a laminar stack of metal plates.

However, Burr et al. disclose forming drop generators by implementing a laminar stack of stainless steel plates (col. 7, lines 15-18).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize a laminar stack of metal plates to form the drop generators in the invention of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Burr et al., is to facilitate manufacture of the ink jet print head since layer-to-layer alignment is not critical (col. 7, lines 21-24).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 27 above, and further in view of Silverbrook (US 6270182 B1).

Regarding claim 31:

Bibl et al. as modified by Eck et al. disclose all claimed limitations except that the drop generators receive melted solid ink.

However, Silverbrook discloses that it is known to provide melted solid ink to the drop generators (col. 21, line 10 - col. 22, line 12 and the table of col. 51).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to provide melted solid ink, such as that taught by Silverbrook, into the drop generators of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Silverbrook, is that hot melt ink can be used on almost any medium and dries instantly without cocking the medium (table of col. 51).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bibl et al. as modified by Eck et al., as applied to claim 27 above, and further in view of Burr et al. (US 5907338).

Regarding claim 32:

Bibl et al. as modified by Eck et al. do not expressly disclose that the drop generators are implemented in a laminar stack of metal plates.

However, Burr et al. disclose forming drop generators by implementing a laminar stack of stainless steel plates (col. 7, lines 15-18).

Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize a laminar stack of metal plates to form the drop generators in the invention of Bibl et al. as modified by Eck et al. The motivation for doing so, as taught by Burr et al., is to facilitate manufacture of the ink jet print head since layer-to-layer alignment is not critical (col. 7, lines 21-24).

Response to Arguments

Applicant's arguments with respect to claims 1, 11, 17, and 27 have been considered but are moot in view of the new ground(s) of rejection. Please see the above combination of Bibl et al. as modified by Eck et al., which discloses columnar arrays comprised of first and second sub-columns of ink drop generators that are interleaved such that each ink drop generator in the first sub-column is physically separated from every other ink drop generator in the first sub-column by at least a portion of one of the ink drop generators in the second sub-column.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shelby Fidler
Patent Examiner
AU 2861

MATTHEW LUU
SUPERVISORY PATENT EXAMINER